

Very High Gain and Low Noise Near Infrared Single Photon Counting Detectors and Arrays, Phase I

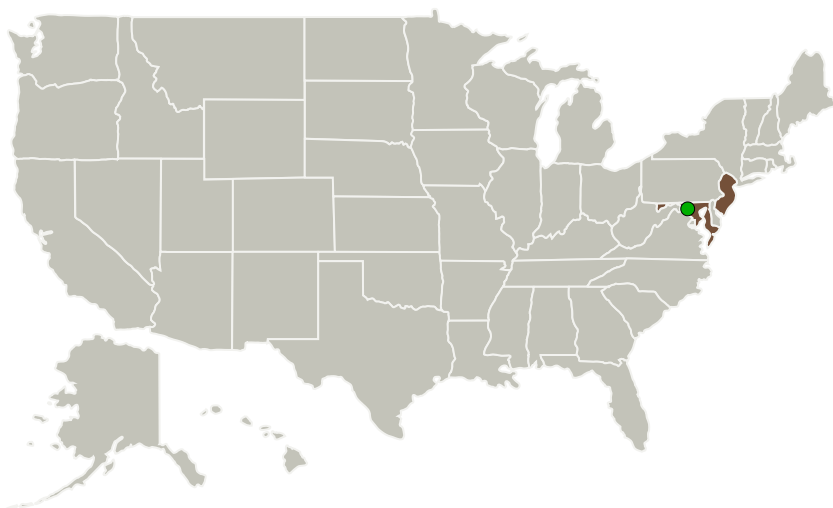
Completed Technology Project (2010 - 2010)



Project Introduction

Amplification Technologies Inc ("ATI") proposes to develop the enabling material and device technology for the design of ultra low noise, high gain and low cross-talk & after pulsing near-infrared single photon counting photodetectors and photodetector arrays sensitive in the eyesafe wavelengths of 1550 nm and 1800 nm spectral region for remote and atmospheric sensing applications, based on the already proven mechanism of internal discrete amplification technology. We plan to achieve this by integrating the internal discrete amplification device design that gave promising results and proved the concept of internal discrete amplification mechanism in the InP material system. The primary accomplishments from the Phase I effort would be the development of ultra low noise, high gain, low noise and low cross-talk & after pulsing near-infrared photodetectors and photodetector arrays sensitive in the 1550 nm and 1800 nm spectral region. The technology of internal discrete amplification enables the combination of high speed, very high gain and ultra low noise. This is possible because the internal discrete amplification nullifies the effect of impact ionization coefficients and prevents the edge break down, with high quantum efficiency and high speed of operation. These photodetectors can be used in eye-safe Lidar/Ladar, atmospheric sensing, 3D imaging, missile seekers, battlefield target identification and recognition system. Potential civilian applications include fiber-optic telecommunications, remote sensing and laser spectroscopy.

Primary U.S. Work Locations and Key Partners



Very High Gain and Low Noise Near Infrared Single Photon Counting Detectors and Arrays, Phase I

Table of Contents

Project Introduction	1
Primary U.S. Work Locations and Key Partners	1
Project Transitions	2
Organizational Responsibility	2
Project Management	2
Technology Maturity (TRL)	2
Technology Areas	3
Target Destinations	3

Very High Gain and Low Noise Near Infrared Single Photon Counting Detectors and Arrays, Phase I

Completed Technology Project (2010 - 2010)



Organizations Performing Work	Role	Type	Location
Amplification Technologies, Inc.	Lead Organization	Industry	Paramus, New Jersey
● Goddard Space Flight Center(GSFC)	Supporting Organization	NASA Center	Greenbelt, Maryland

Primary U.S. Work Locations	
Maryland	New Jersey

Project Transitions

January 2010: Project Start

July 2010: Closed out

Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/139544>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Amplification Technologies, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

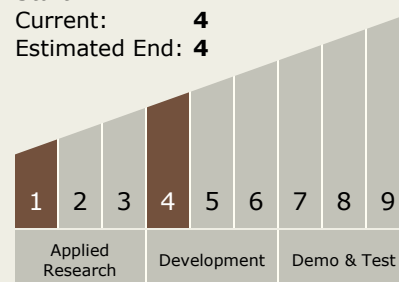
Carlos Torrez

Principal Investigator:

Yuriy Yevtukhov

Technology Maturity (TRL)

Start: **1**
Current: **4**
Estimated End: **4**



Very High Gain and Low Noise Near Infrared Single Photon Counting Detectors and Arrays, Phase I

Completed Technology Project (2010 - 2010)



Technology Areas

Primary:

- TX08 Sensors and Instruments
 - └ TX08.1 Remote Sensing Instruments/Sensors
 - └ TX08.1.1 Detectors and Focal Planes

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System